SOME NOTES ON THE INTERNAL ANATOMY OF LITHOPS: II†

CHESTER B. DUGDALE
(*Fairleigh Dickinson University, Rutherford, New Jersey, U.S.A.*)

The only drawing of the internal anatomy of a Lithops plant known to me s that found in G. C. Nel's LITHOPS. The drawing presented here is a composite based upon the microscopic examination of hundreds of sections of both fresh and preserved plants of many different species. The general outline of the drawing and the general internal plan were adapted from a freshly-cut *L. turbiniformis*, but the photomicrographs were taken from a variety of species. Since there appears to be a universality of cellular structure within the genus, these photomicrographs are not identified as to the species which they actually depict. Each picture was selected only for its value in illustrating a particular area of the general plan.

As was stated in Part I of this series, this study is being pursued in the hope that information of taxonomic value will be found in addition to the knowledge of the cellular anatomy of Lithops plants. At present it appears that if such knowledge is obtained, it will probably be derived from the further study of the tanniniferous idioblasts since they appear to be the only variable elements in an otherwise quite generalized (i.e. genus-wide) cellular construction. For the purpose of learning more about the idioblast patterns, a group of Lithops plants have been collected by the author at some 35 habitat sites in South Africa and are currently being studied. More, either living or preserved, are needed.

ACKNOWLEDGEMENTS

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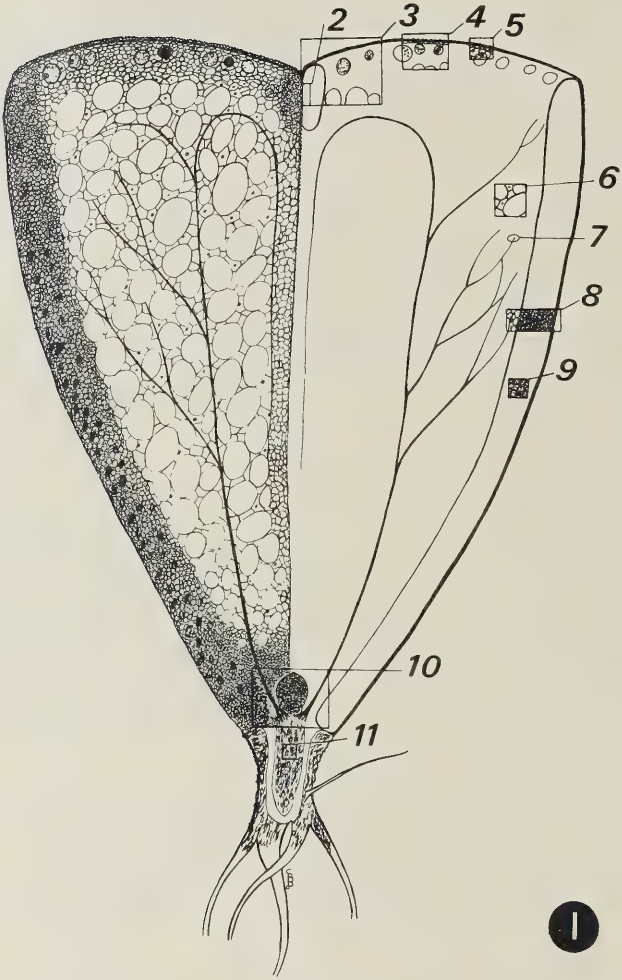
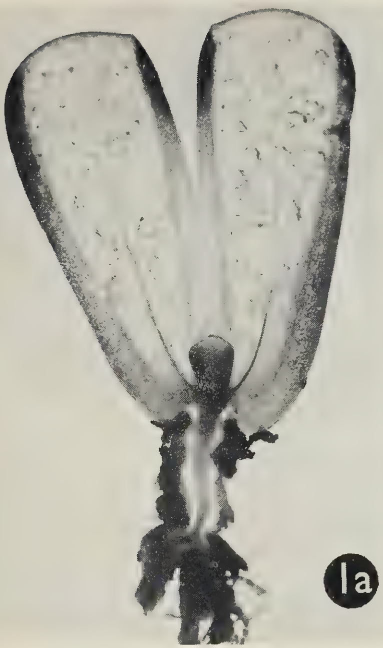


FIG. 1
Generalized Lithops plant body, median l.s.

del. C. B. Dugdale



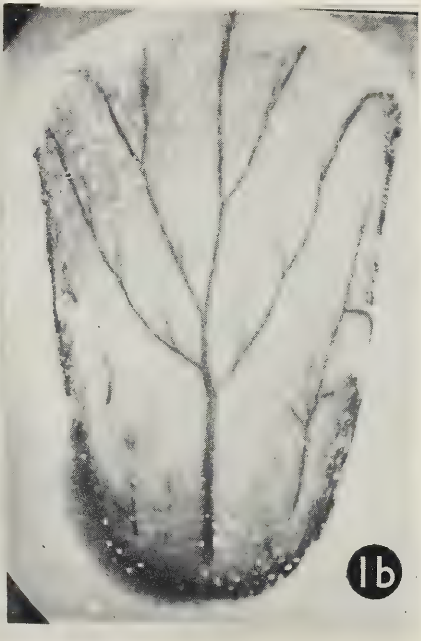


PLATE 1a.

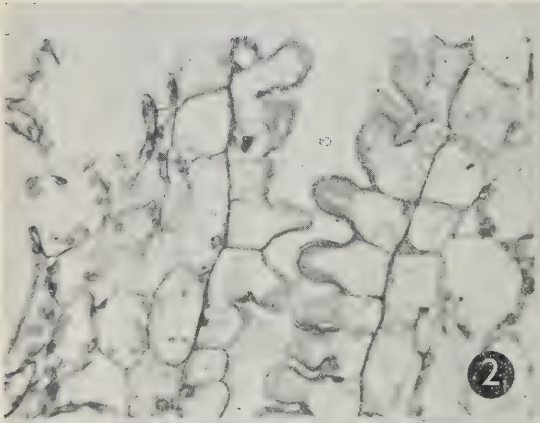
A macrophotograph of a fresh *L. helmutii*, xi, (The image on the negative was the same size as the specimen.) There is, of course, a greater separation between the leaves than in *L. turbiniformis* and there are more chlorenchymatous cells to be seen on the adaxial walls, but the general plan is similar to that shown in the drawing. The root-stem complex and the new set of developing leaves are noteworthy.

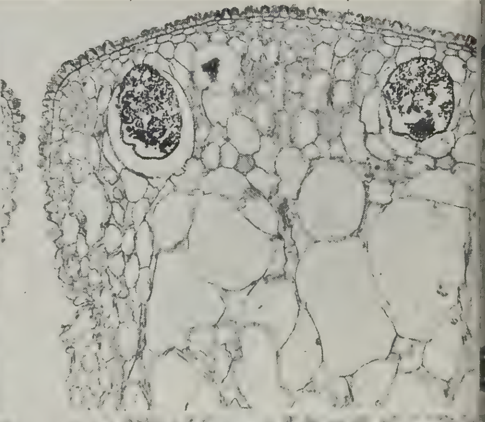
PLATE 1b.

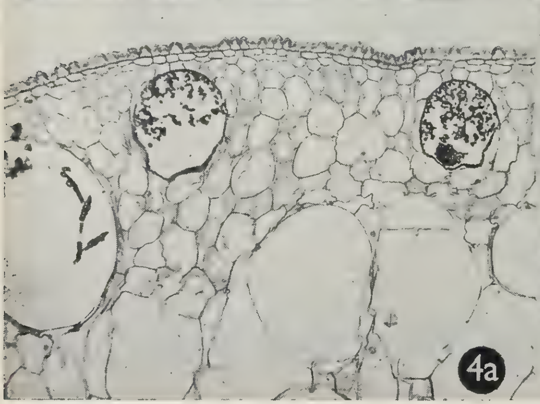
This shows the vascular system in a leaf treated by the technique described in Part II of this series, x5. The plane of this picture is at right angle to the plane of the drawing and the vascular bundles are seen overlying the chlorenchyma, beneath which lies the unseen inside of the epidermal layer.

PLATE 2.
A prepared and stained section of two lithops leaves showing the fissure between them, x430. Most noteworthy are the epidermal cells seen interdigitating with those of the opposite leaf. See also the layer of quite regular brick-shaped cells which are consistently found underlying the epidermal layer. These cells will hereafter be referred to as the epidermal base layer.

PLATE 3.
A view of the upper left corner of the drawing, x100. The epidermal base layer supporting the epidermis is again present. Two complete, plastid-type, tanniniferous idioblasts are shown, as well as a fragment of a third. Note the dark nucleus-like body in the lateral idioblast of this plate and also in plate 5(*b*). Large water-storing cells are seen in the lower portion of the picture.







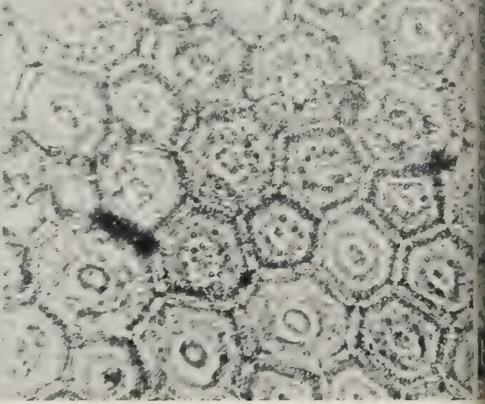
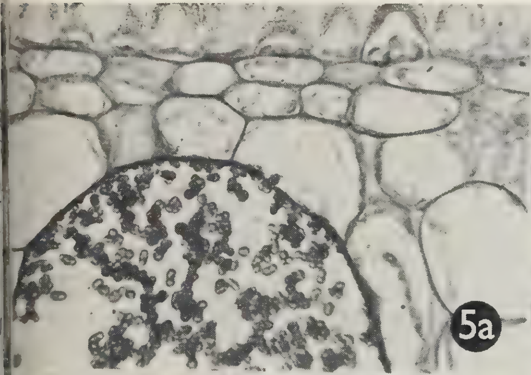


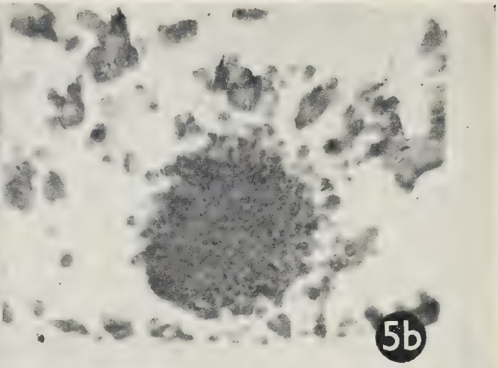
PLATE 4a.
A continuation of plate 3 showing more of the upper portion of the leaf, x100.

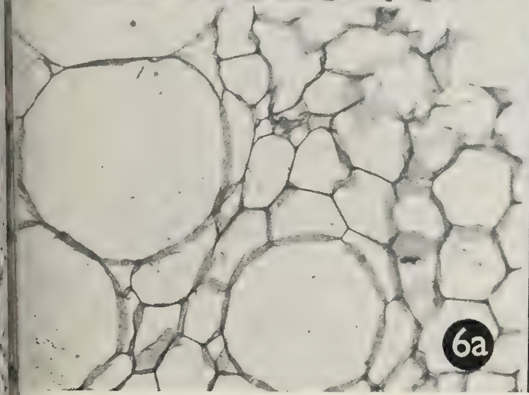
PLATE 4b.
A view of the underside of the epidermal layer showing the chromoplasts, x430. Fresh material, hand cut by razor blade.

PLATE 5a.
The upper half of a tanniniferous idioblast and the cells lying between it and the epidermis, x430.

PLATE 5b.
Detail of the nucleus-like portion of a tanniniferous idioblast, x430.







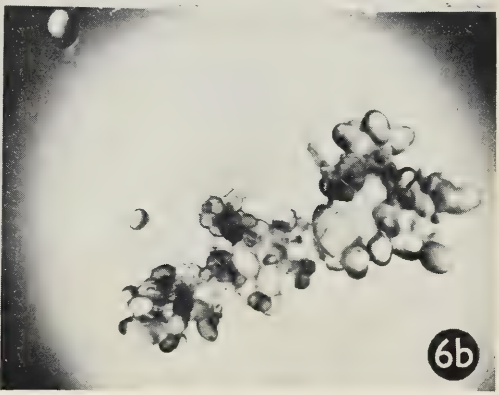


PLATE 6a
A section of the central core of the leaf showing the water-storage parenchyma and surrounding cells, x430.

PLATE 6b.
A cluster of water-storage parenchyma cells removed from a diseased and disintegrating leaf, x10. When a lithops leaf begins to rot and its central core becomes mushy, the water-storing cells are the last to be affected. Since the surrounding cells decompose first, scores of these intact water cells can be scooped out of the leaf with an appropriate instrument.

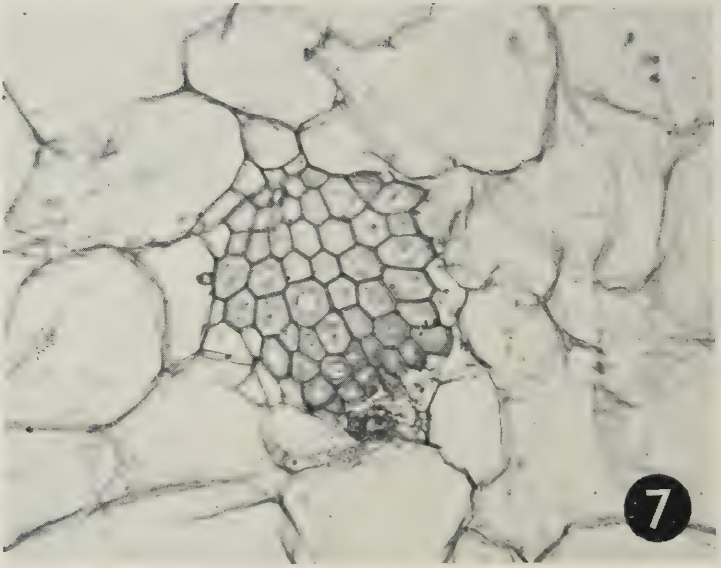
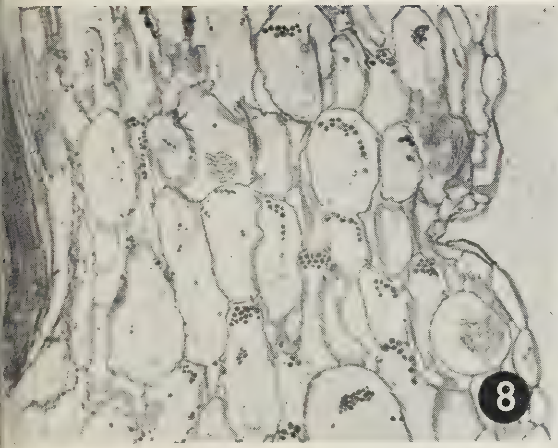


PLATE 7.
A cross-section of a vascular bundle, x430. Note the thickness of the walls of the xylem cells and the relative scarcity of phloem cells.



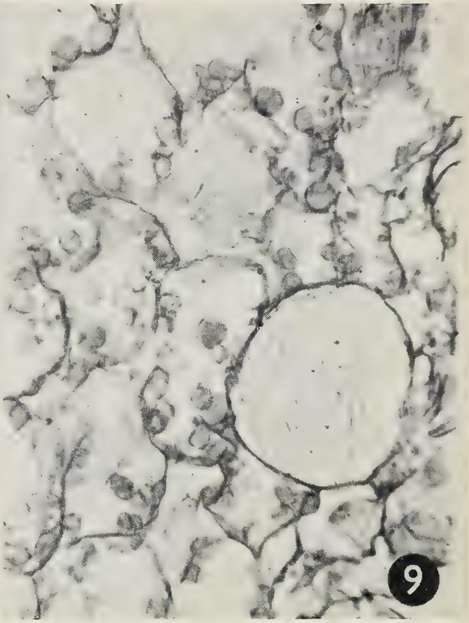
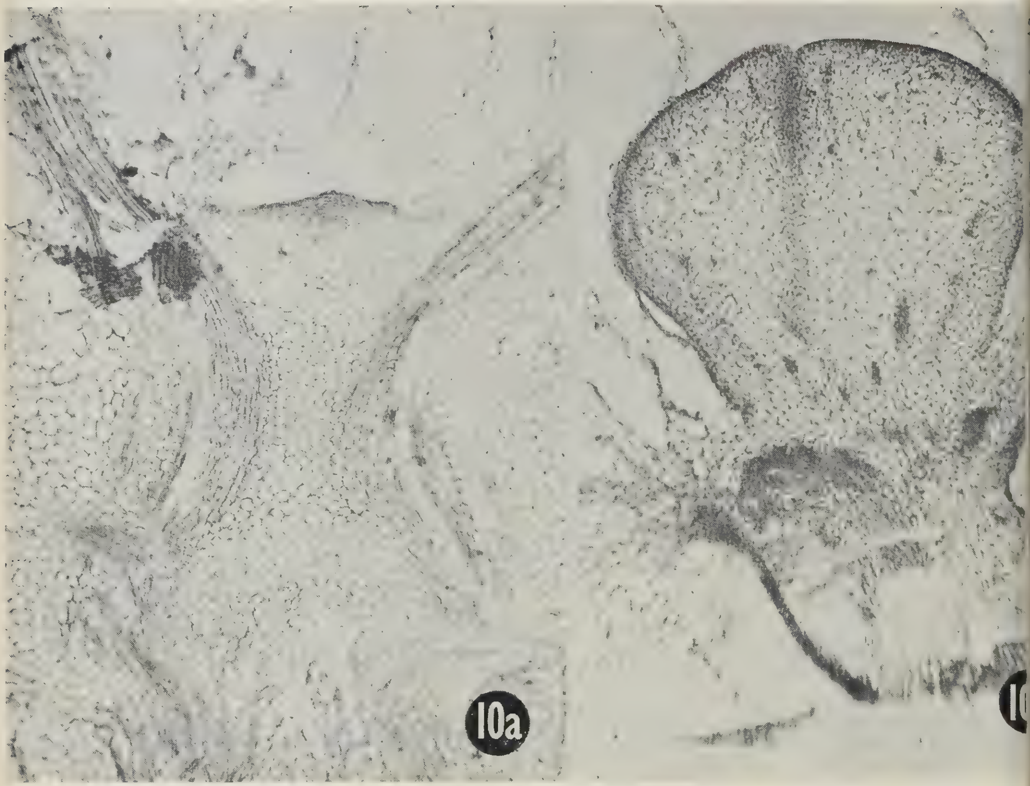


PLATE 8.
A section of chlorenchyma, x100. Included are serveral cells containing calcium oxalate raphides and a short length of a vascular bundle. In the fresh whole leaf the raphides are seen as glistening white specks which are more numerous in the area just beneath the epidermis as opposed to deeper within, and also they are more numerous toward the root as opposed to higher up.

PLATE 9.
Detail of chlorenchyma cells and a raphide cell, x430



Plates 10 a and b.
Two views of the region where the root, stem, and leaf conjoin, x100. Plate 10 (*a*) shows the meristematic region and (*b*) the leaf primordia.

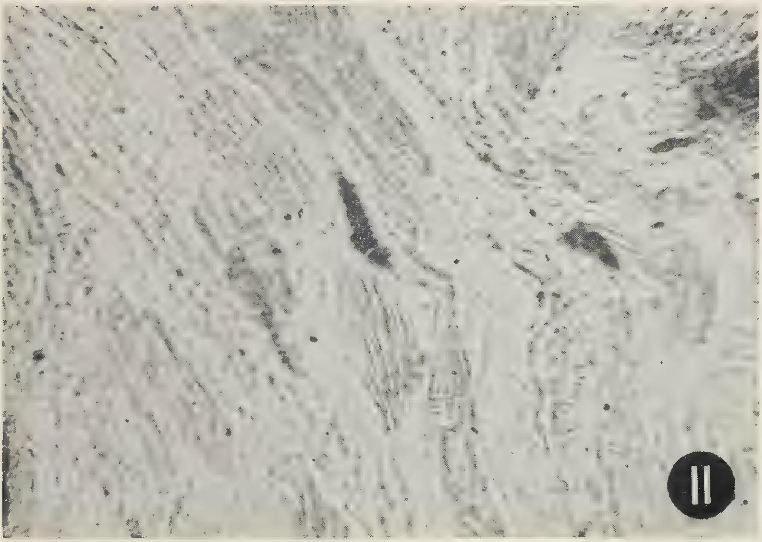


PLATE 11.
A portion of root tissue, x430. The major cellular components of this region appear to be calcium oxalate raphide cells and xylem vessels. I have so far found no particular pattern of organization of these elements.

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